The Long-term and Anti-aging Effect of Qigong for Patients with Chronic Fatigue Syndrome

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Outlines

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  - Telomerase activity
  - Qigong
- Methods
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  - Subjects
  - Data collection and data analysis
- Results
- Conclusion

Background

Chronic Fatigue/Chronic Fatigue Syndrome (CFS)

- Chronic Fatigue is a common complaint both in general population and primary care setting
  - 10.7% in Hong Kong Chinese adult

(Wong & Fielding, 2010)

- Chronic Fatigue Syndrome (CFS) which is distinguished from CF by severity and chronicity, is characterized as unexplained persistent fatigue for at least 6 months
  - 6.4% in Hong Kong population

(Yiu & Yo, 2005)

Chronic Fatigue Syndrome

- Diagnosis criteria (CDC)

  1. Unexplained, persistent fatigue

  2. **Four or more** of the following symptoms are present for six months or more:

     1) Impaired memory or concentration;
     2) Postexertional malaise (extreme, prolonged exhaustion following physical or mental activity);
     3) Unrefreshing sleep;
     4) Muscle pain;
     5) Multi-joint pain;
     6) Headaches of a new type;
     7) Sore throat;
     8) Tender lymph nodes

(According to: US Centers for Disease Control and Prevention (CDC)).

Current treatments for CFS

- Mainly seek to alleviate symptoms (U.M.Nater, et al, 2011)
- Mainstream medical treatment are often associated with limited clinical benefits (Huibers et al., 2004)
  - Some may even experience undesirable side-effects (Chen et al, 2010)
- Complementary and alternative therapies are often used by individuals with CF/CFS to manage their symptoms (Afari et al., 2000; Porter et al, 2010)

Traditional Chinese Medicine (TCM)

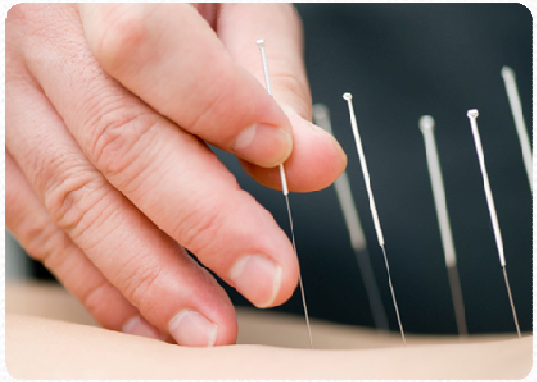
- CF/CFS is caused by blood stasis due to Qi(vital energy) deficiency

- Stimulation of the blood and Qi circulation (行氣活血） is the core treatment strategy for CF/CFS

(Adam, et al., 2009; Chen, et al., 2010)

Ways of stimulating Qi circulation

- Herbal medicine
- Accuncpture and massage
- Dietary modification
- Moderate exercises related to Qi movement of the body
  - Qigong



Qigong: Body-mind exercise

- Qigong, a body-mid exercise
- Through gentle movements, it helps
  - mind regulation
  - body regulation
  - breath regulation

- Aims to achieve a harmonious flow of vital energy (Qi) in the body

(Manek &Lin, 2012)

Qigong and CFS

- Two pilot studies have been conducted in patients with CF/CSF for evaluating the beneficial effects of Qigong:
  - Desirable effects were found
    - Improvement in sleep quality, pain, emotional attitude, general mobility.
  - Recommendation: the effects of Qigong should be further tested in large-scale RCTs

(Craske, et al, 2009; Dybwad, 2007)

Effects of Qigong

Can be considered as multilevel:

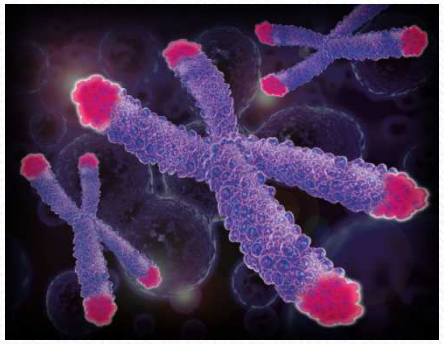
- Disease treatment
- Disease prevention : improve general health through mind-body regulation
- Longevity: prolong life (*yang sheng*), anti-aging

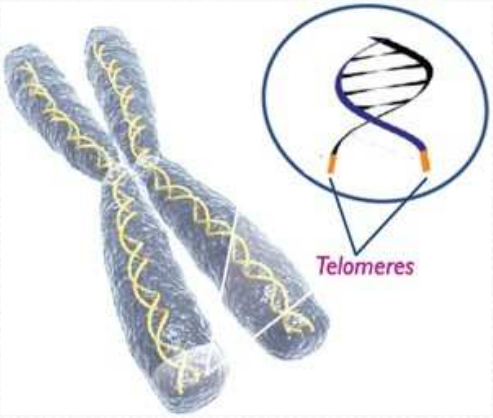
Longevity and Aging

- Multifactorial
- Cellular aging : the role of telomere

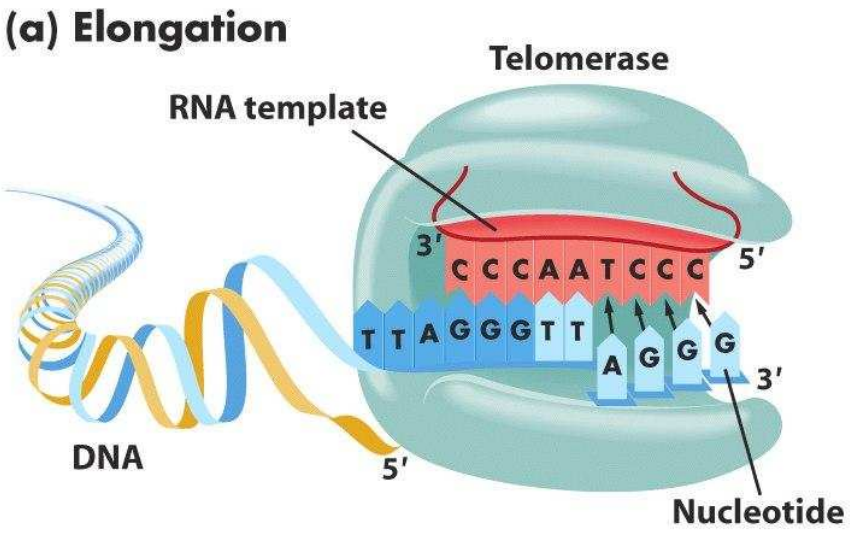
Telomere

- A Telomere is a region of repetitive nucleotide sequences at the end of a chromosome
- It caps chromosomal ends and protect chromosomes from shortening during cell division
- Cell senescence or apoptosis will be the result if telomeres become critically short
- Telomere length (TL) is an indicator of a cell's biological "age"





Telomerase



- A cellular enzyme
- Contains both an essential RNA and a protein reverse transcriptase subunit
- Adds DNA sequence repeats to the end of DNA strands in the telomere regions
- Protects and allows for "reconstruction" of the telomere, thus prolonging cell life

Telomerase

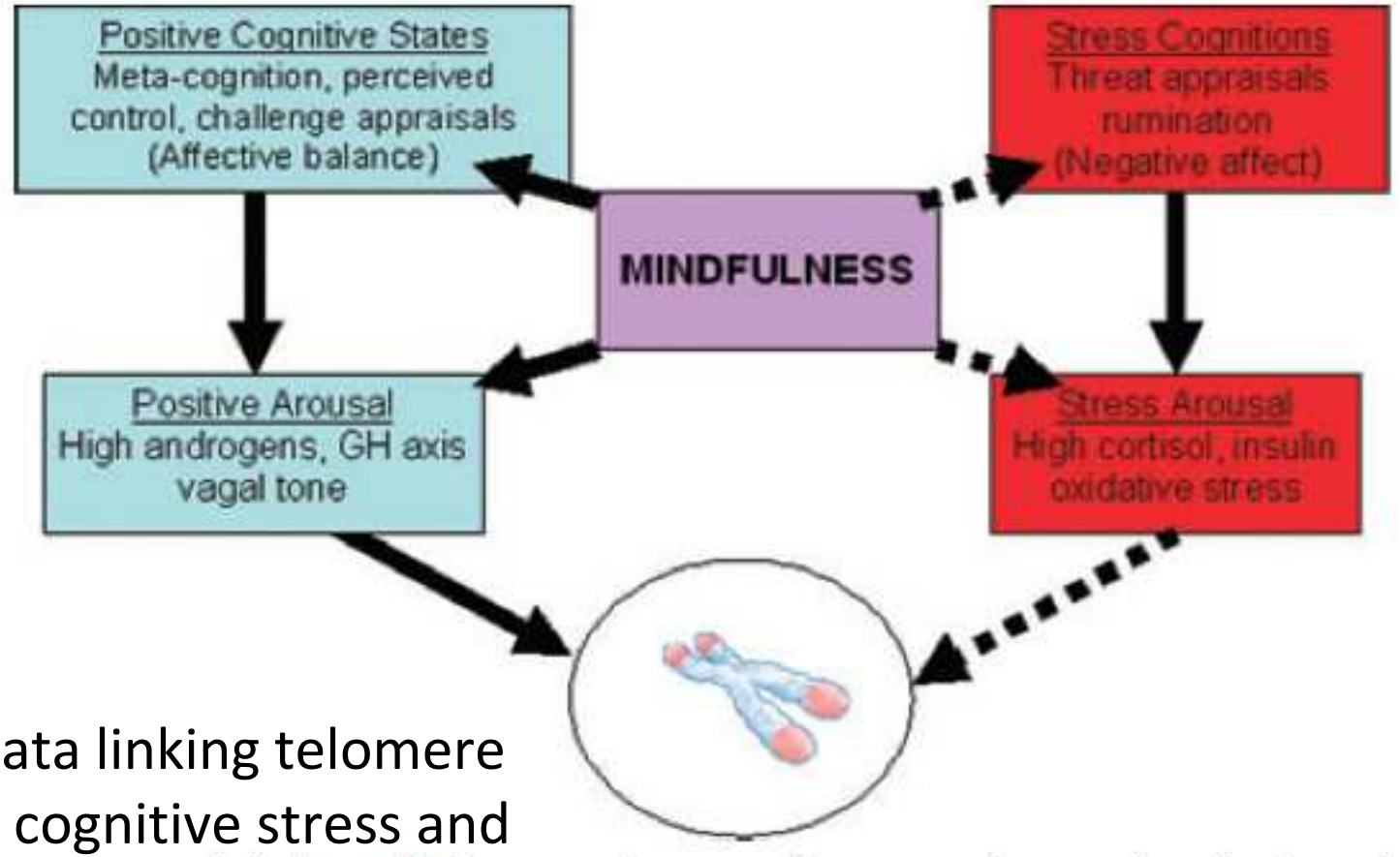
- Telomerase activity >>> Integrity of telomere

- Biomarker
- Indicator of cellular aging

- It has been found that life stress is associated with lower telomerase activity and shorter telomere length in peripheral blood mononuclear cells

Epel, E., et al (2004) PNAS 101: 17312 - 17315

Meditation may slow rate of cellular aging



Review data linking telomere length to cognitive stress and stress arousal.

Epel E. (2009) Annals of the New York Academy of Science. 1172: 34 - 53

Our previous study

- Our Previous Randomized Controlled Trails (RCT) (n=114) has demonstrated that

  Qigong exercise had short-term effect in
  - Reducing fatigue
  - Improving quality of life
  - Improving the spiritual well-being

(Chan JSM, et al. (Abstract) Annals of Behavioral Medicine, s224, 2011)

Objectives

- To assess the long-term effects of qigong exercise on fatigue and quality of life in terms of physical and mental functioning
- To assess the impact of qigong exercise on telomerase activity (an anti-aging biomarker)

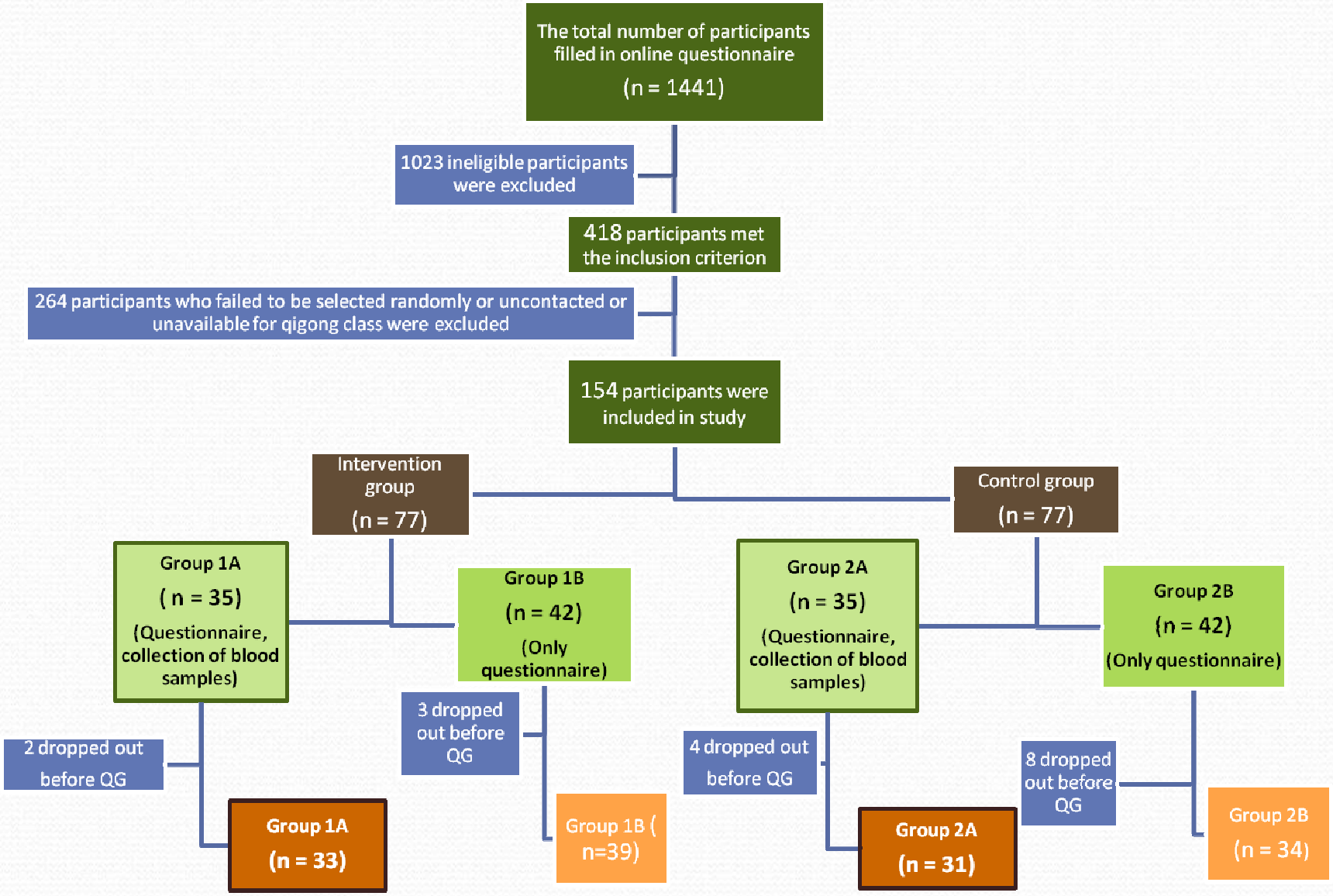
Methods

Study design

- Randomized waitlist-controlled trial

- Participants:
  - Community sample
  - Adults aged 18-55 years old
  - Had CF/CFS symptoms based on self-reported symptoms and medical history by online screening questionnaire based on CDC CFS criteria
  - Without medical examination by physician

Flow chart of participants into the study



Prospective Randomized Controlled Trial (RCT)

154 participants were randomly selected from a pool of 418 qualified participants. They were then randomly allocated into:

- Intervention group: n = 77 (5 dropped out, final n=72)
- Control group = 77 (12 dropped out, final n=65)

- From each group, we randomly selected 35 participants for telomerase activity assessment:
  - n= 33 (2 dropped out from 35) in intervention group
  - n= 31 (4 dropped out from 35) in control group

Intervention

- 10 sessions of exercise qigong (wu xing ping heng gong, 五行平衡功)
- 2 hours per session, and twice a week for 5 weeks
- Self practice (15 – 30 minutes per day) at home
- Two parts
  - Movement exercise (10 forms)
  - Meditation

Outcome measurements

- Fatigue level: Chalder's Fatigue (CF) scale
  - Total fatigue score: sum of all items
    - Physical fatigue: sum of items 1 - 8
    - Mental fatigue: sum of items of 9 – 14
- Quality of life: SF-12 Health Survey Questionnaire
    - Physical Component Summary (PCS)
    - Mental Component Summary (MCS)
- Telomerase activity in blood sample

Data collection

- Demographic data, lifestyle, Chalder's fatigue, SF-12 were collected through the online questionnaire
  - Three time points
    - Baseline (T0)
    - 5 weeks, Post-training (T1)
    - Post-3 months (T2)
- Telomerase activity in blood sample collected at T0 and T2

Results

Table 1 Patients' demographic information (n=137)

Demographic	Intervention (n = 72)		Control (n = 65)		*P**
	Mean (SD)	N (%)	Mean (SD)	N (%)	
Age (years)	42.4 (6.7)		42.5 (6.4)		.979
Gender					
Female		52 (72.2%)		53 (81.5%)	.198
Employment					
Full-time		55 (76.4%)		52 (80.0%)	
Part-time		3 (4.2%)		1 (1.5%)	
Housewife		9 (12.5%)		10 (15.4%)	.629
Unemployed		4 (5.6%)		1 (1.5%)	
Other		1 (1.4%)		1 (1.5%)	
Education					
Form 1 to 5		23 (31.9%)		26 (40.0%)	
Form 6 to 7		7 (9.7%)		7 (10.8%)	
Tertiary or University		34 (47.2%)		19 (29.2%)	.142
Master or above		7 (9.7%)		13 (20.0%)	
Other		1 (1.4%)		0	
Marital status					
Single		21 (29.2%)		23 (35.4%)	
Married/cohabiting		46 (63.9%)		38 (58.5%)	
Divorced/separated		5 (6.9%)		2 (3.1%)	.435
Widowed		0		1 (1.5%)	
Other		0		1 (1.5%)	
Religion					
Yes		21 (29.2%)		24 (36.9%)	.334
Income					
< 10,000		11 (15.3%)		6 (9.2%)	
10,000 – 19,999		20 (27.8%)		18 (27.7%)	
20,000 – 29,999		9 (12.5%)		8 (12.3%)	.824
>= 30,000		9 (12.5%)		10 (15.4%)	
No income/not available		10 (13.9%)		7 (10.8%)	
Don't want to answer		13 (18.1%)		16 (24.6%)	

Table 2 The lifestyles and the influences of Chronic Fatigue Syndrome (CFS) (n = 137)

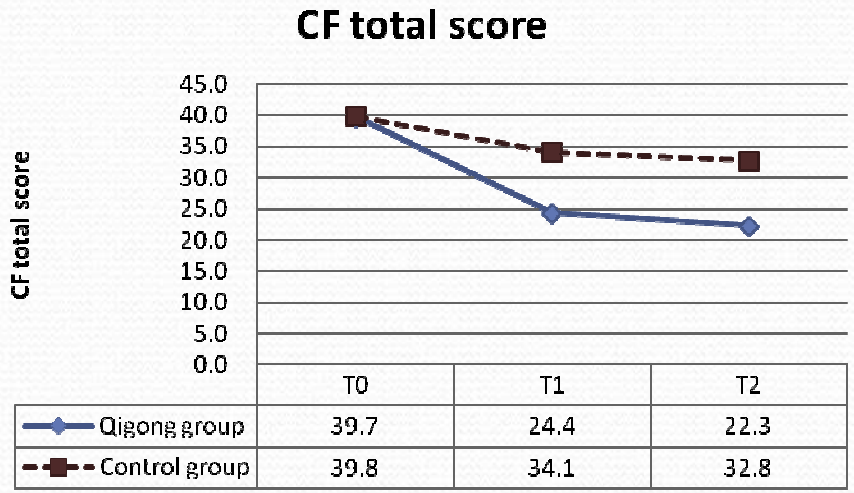
	Intervention (n = 72)	Control (n = 65)	*P**
	N (%)	N (%)	
Exercise habit			
Do exercise occasionally	53 (73.6%)	48 (73.8%)	.975
Do exercise regularly	19 (26.4%)	17 (26.2%)	
Smoking			
Yes	6 (8.3%)	2 (3.1%)	.190
Alcohol drinking			
Yes	31 (43.1%)	22 (33.8%)	.269
CFS affected work and/or life	62 (86.1%)	52 (80.0%)	.339
Feel being misunderstood	37 (51.4%)	37 (56.9%)	.516

Table 3 Chalder's fatigue (CF) scale (n = 137)

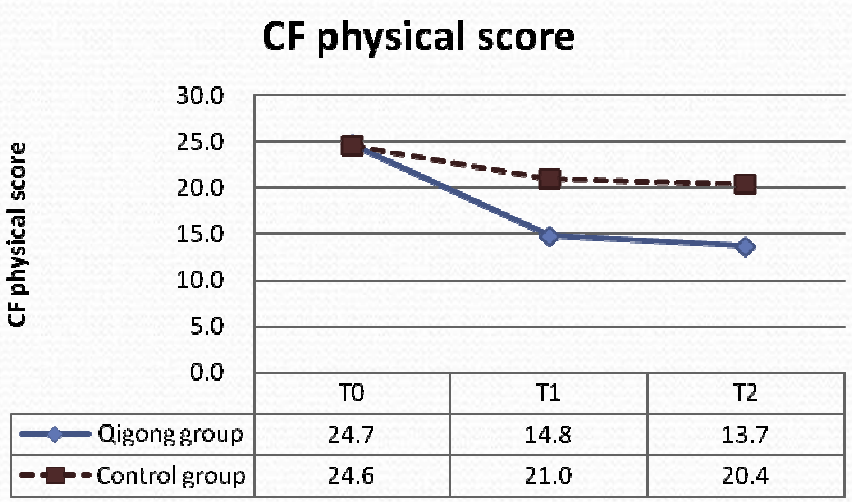
	Intervention (n = 72)	Control (n = 65)	*P**
	Mean (SD)	Mean (SD)	
CF total score			
Before (T0)	39.7 (6.6)	39.8 (6.3)	.916
Post training (T1)	[15] 24.4 (12.0)	[3] 34.1 (8.8)	**.000**
Post 3-month (T2)	[19] 22.3 (11.6)	[7] 32.8 (9.7)	**.000**
T1 – T0	[15] -14.7 (10.3)	[3] -5.8 (7.3)	**.000**
T2 –T0	[19] -16.1 (10.8)	[7] -6.8 (8.2)	**.000**
CF physical score			
Before (T0)	24.7 (4.0)	24.6 (3.7)	.887
Post training (T1)	[15] 14.8 (7.4)	[3] 21.0 (5.2)	**.000**
Post 3-month (T2)	[19] 13.7 (6.8)	[7] 20.4 (5.8)	**.000**
T1 – T0	[15] -9.7 (6.5)	[3] -3.6 (4.2)	**.000**
T2 –T0	[19] -10.5 (6.6)	[7] -4.0 (5.0)	**.000**
CF mental score			
Before (T0)	15.0 (3.8)	15.2 (3.9)	.750
Post training (T1)	[15] 9.6 (5.5)	[3] 13.1 (4.6)	**.000**
Post 3-month (T2)	[19] 8.9 (5.4)	[7] 12.3 (4.9)	**.001**
T1 – T0	[15] -5.0 (4.7)	[3] -2.2 (3.7)	**.000**
T2 –T0	[19] -5.6 (5.3)	[7] -2.8 (3.8)	**.000**

CF: Chalder's fatigue, * T-test, [Number of missing data],

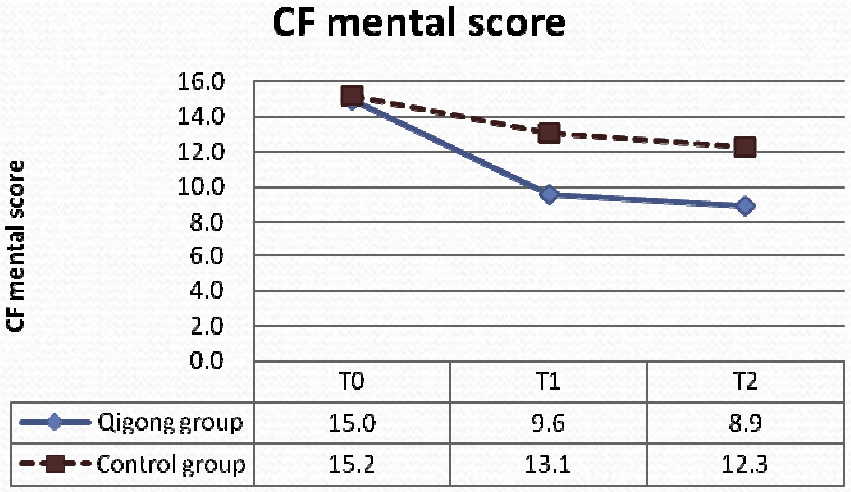
Chalder's fatigue scale (n=137)



	T0	T1	T2
Qigong group	39.7	24.4	22.3
Control group	39.8	34.1	32.8



	T0	T1	T2
Qigong group	24.7	14.8	13.7
Control group	24.6	21.0	20.4



	T0	T1	T2
Qigong group	15.0	9.6	8.9
Control group	15.2	13.1	12.3

Figure 1. Comparison of Chalder's fatigue (CF) scale between two groups (n = 137)

Table 4 Quality of life (SF-12) (n = 137)

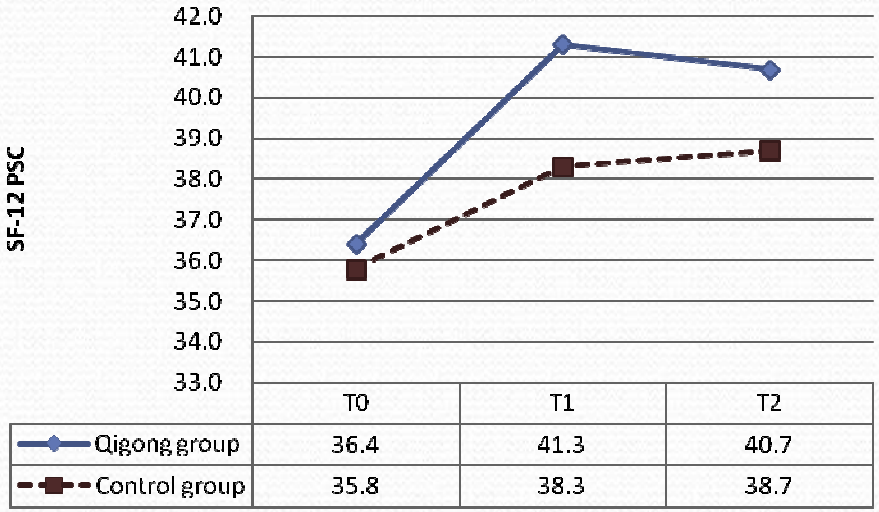
	Intervention (n = 72)	Control (n = 65)	*P**
	Mean (SD)	Mean (SD)	
SF-12-PCS score			
Before (T0)	36.4 (6.6)	35.8 (7.2)	.632
Post training (T1)	[15] 41.3 (7.0)	[3] 38.3 (7.6)	**.026**
Post 3-month (T2)	[19] 40.7 (7.6)	[7] 38.7 (6.8)	.154
T1 – T0	[15] 4.8 (7.0)	[3] 2.6 (5.9)	**.072**
T2 –T0	[19] 4.4 (7.4)	[7] 3.2 (6.6)	.373
SF-12-MCS score			
Before (T0)	32.4 (10.2)	33.5 (8.7)	.514
Post training (T1)	[15] 42.6 (8.5)	[3] 34.0 (9.1)	**.000**
Post 3-month (T2)	[19] 42.9 (9.3)	[7] 35.2 (10.3)	**.000**
T1 – T0	[15] 9.8 (11.9)	[3] 0.5 (8.1)	**.000**
T2 –T0	[19] 8.2 (11.7)	[7] 1.2 (9.5)	**.001**

PCS: physical component summary, MCS: mental component summary

* T-test, [Number of missing data]

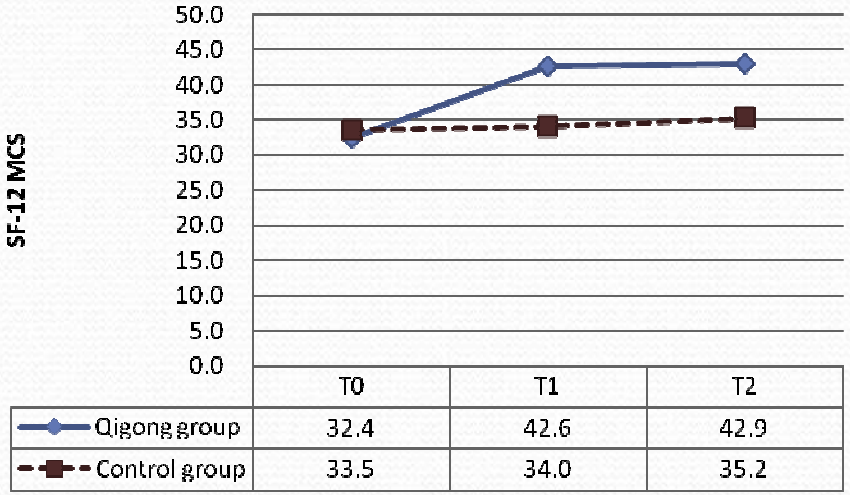
SF-12

SF-12 Physical component summary



	T0	T1	T2
Qigong group	36.4	41.3	40.7
Control group	35.8	38.3	38.7

SF-12 mental component summary



	T0	T1	T2
Qigong group	32.4	42.6	42.9
Control group	33.5	34.0	35.2

Table 5 Telomerase activity (n=64)

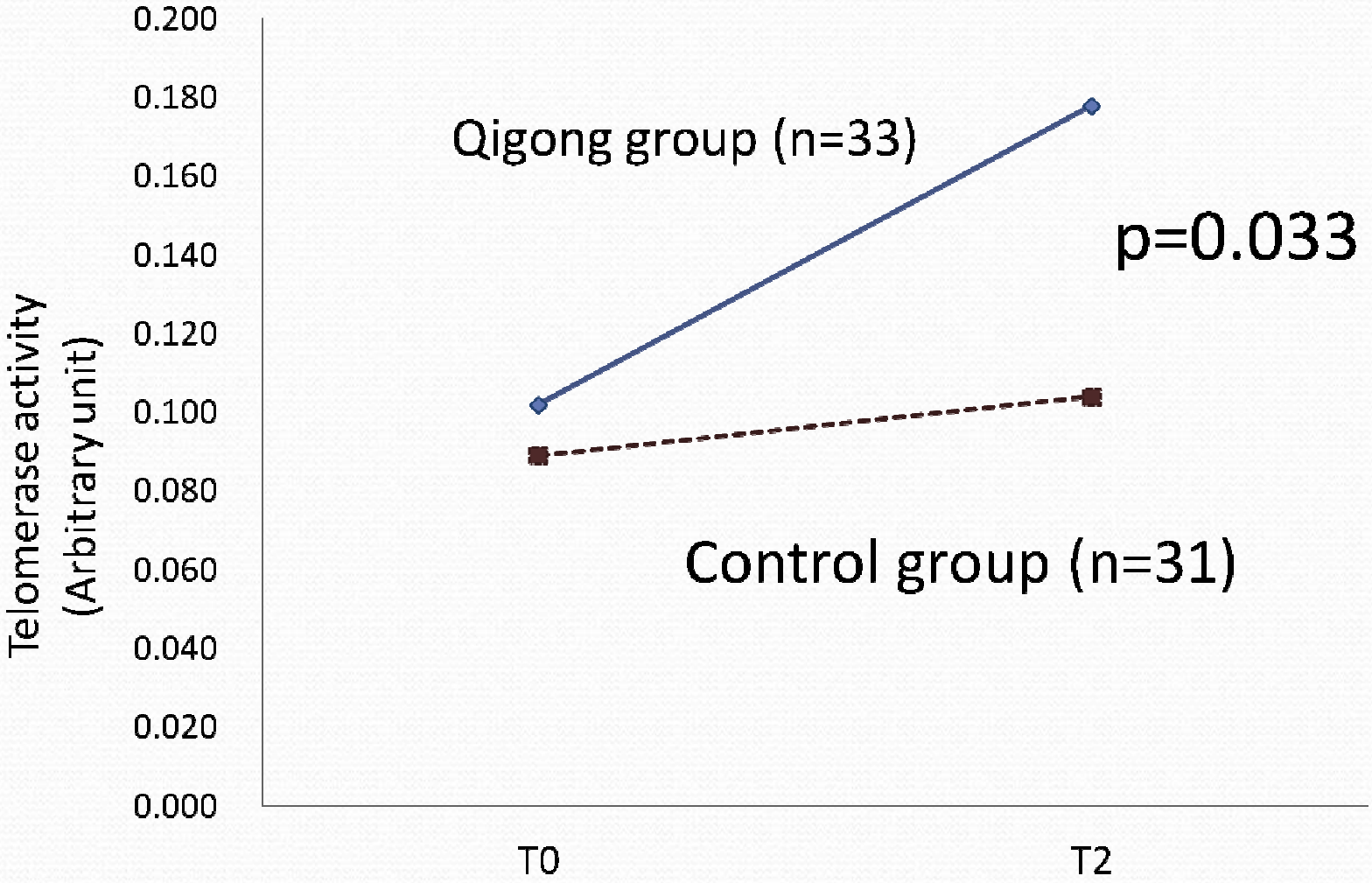
Telomerase activity (Arbitrary unit)	Intervention group 1A (n = 33)	Control group 2A (n = 31)	P*
	Mean (SD)	Mean (SD)	
Before (T0)	0.102 (0.051)	0.089 (0.036)	.238
Post 3-month (T2)	0.178 (0.201)	0.104 (0.059)	**.049**
T2 –T0	0.077 (0.198)	0.015 (0.062)	.099

*T-test

Telomerase activity (Arbitrary unit)	Baseline (T0)	Post-3 month (T2)	Difference (T2 – T0)	*P**
	Mean (SD)	Mean (SD)	Mean (SD)	
Intervention group (n = 33)	0.102 (0.051)	0.178 (0.201)	-0.077 (0.198)	**.033**
Control group (n = 31)	0.089 (0.036)	0.104 (0.059)	-0.015 (0.062)	.176

*Pairwise T-test

Telomerase activity (n = 64)



Limitations

- Some subjects might not fully meet the CDC criteria for CFS
  - Subjects recruited from the community
  - The diagnosis only based on the self-reported symptoms and medical history
  - No further medical examination
- Telomerase activity was not tested at the post-intervention (T1) and only performed on some but not all participants in two groups
- Level of perceived stress was not measured

Conclusions

- Qigong exercise helps reduce fatigue and improve mental functioning in long term and also has potential anti-aging effects on CFS patients.

- Further research using bigger sample with measurement of telomerase activity should be conducted in future.

Acknowledgment

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Thank You!

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